

Appl. No. 09/405,787
Amdt. dated 01/23/2006
Reply to Office action of 09/21/2005

Amendments to the Claims:

The following listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended):

A carrier class switch apparatus comprising:

means for receiving voice calls having TDM voice/fax, VoIP, VoATM and VoFR media types, said means for receiving a voice call having a first media type and a first signaling type corresponding to said first media type;

means for converting voice calls to TDM voice/fax, VoIP, VoATM and VoFR media types, said means for converting said voice call to a second media type different than said first media type;

means for determining said second media type in accordance with instantaneous availability of bandwidth resources;

means for relaying signaling associated with said voice call of said first signaling type to a second signaling type corresponding to said second media type; and

means for forwarding said voice call having said second media type.

2. (previously presented):

An apparatus according to claim 1, wherein said means for receiving a voice call includes means for receiving said voice call at a first interface of said switch apparatus, said first

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interface being one of a broadband interface and a narrowband interface, and wherein said means for forwarding said voice call includes means for forwarding said voice call at a second interface of said switch apparatus, said second interface being one of said broadband interface and said narrowband interface.

3. (previously presented):

An apparatus according to claim 1, further comprising:

means for associating said voice call with a quality of service requirement that is specific to said voice call.

4. (previously presented):

An apparatus according to claim 3, further comprising:

means for determining said quality of service requirement in accordance with a service plan profile specific to said calling party associated with said voice call.

5. (cancelled)

6. (original):

An apparatus according to claim 2, further comprising:

means for switching packets associated with said voice call between said first interface and said second interface.

7. (original):

An apparatus according to claim 6, further comprising:

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means for converting said voice call into said packets having an intermediate switching media type.

8. (original):

An apparatus according to claim 7, wherein said intermediate switching media type is ATM cells.

9. (original):

An apparatus according to claim 6, further comprising:

means for associating said voice call with a quality of service requirement, said means for switching packets associated with said voice call being adapted to switch said packets at a rate corresponding to said quality of service requirement.

10. (previously presented):

An apparatus according to claim 9, further comprising:

means for determining said quality of service requirement in accordance with a service plan profile specific to said calling party associated with said voice call.

11. (cancelled)

12. (currently amended):

A method of providing differential voice over the network services in a carrier class switch apparatus comprising:

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receiving a voice call having a first media type with a broadband interface capable of receiving TDM voice/fax, VoIP, VoATM and VoFR media types, said voice call having a first signaling type corresponding to said first media type;

converting said voice call to a second media type different than said first media type, said second media type being any one of TDM voice/fax, VoIP, VoATM and VoFR media types;

determining said second media type in accordance with instantaneous availability of bandwidth resources;

relaying signaling associated with said voice call of said first signaling type to a second signaling type corresponding to said second media type; and

forwarding said voice call having said second media type.

13. (original):

A method according to claim 12, wherein said step of receiving said voice call includes receiving said voice call at a first interface of said switch apparatus, said first interface being one of a broadband interface and a narrowband interface, and wherein said step of forwarding said voice call includes forwarding said voice call at a second interface of said switch apparatus, said second interface being one of said broadband interface and said narrowband interface.

14. (original):

A method according to claim 12, further comprising:

associating said voice call with a quality of service requirement.

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15. (previously presented):

A method according to claim 14, further comprising:

determining said quality of service requirement in accordance with a service plan profile
of said calling party associated with said voice call.

16. (cancelled)

17. (original):

A method according to claim 13, further comprising:

switching packets associated with said voice call between said first interface and said
second interface.

18. (original):

A method according to claim 17, further comprising:

said voice call into said packets having an intermediate switching media type.

19. (original):

A method according to claim 18, wherein said intermediate switching media type is ATM
cells.

20. (original):

A method according to claim 17, further comprising:

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associating said voice call with a quality of service requirement, said step of switching packets associated with said voice call being performed so as to switch said packets at a rate corresponding to said quality of service requirement.

21. (previously presented):

A method according to claim 20, further comprising:

determining said quality of service requirement in accordance with a service plan profile specific to said calling party associated with said voice call.

22. (cancelled)

23. (previously presented):

A carrier class switch apparatus integrated in a single switching platform comprising:

a switching fabric adapted to switch packets between a plurality of broadband switching ports;

a broadband interface coupled to one of said plurality of broadband switching ports, said broadband interface being adapted to communicate voice calls between said switching fabric and a broadband connection, said broadband interface with said broadband connection capable of communicating TDM voice/fax, VoIP, VoATM and VoFR media types;

a local switch module coupled to another one of said plurality of broadband switching ports;

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a narrowband interface coupled to said local switch module, said narrowband interface being adapted to communicate voice calls between said switching fabric and a narrowband connection, said narrowband interface capable of communicating TDM voice/fax, VoIP, VoATM and VoFR media types;

a switch control card coupled to said broadband interface and said narrowband interface, said switch control card being adapted to relay signaling associated with a voice call between said broadband connection and said narrowband connection, said voice call having a first signaling type corresponding to a first media type at said broadband connection and a second signaling type corresponding to a second media type different than said first media type at said narrowband connection; and

a call server coupled to said switch control card to determine said second media type in accordance with a service plan profile of a calling party associated with said voice call.

24. (original):

An apparatus according to claim 23, wherein said switch control card is further adapted to route and manage virtual circuit connections between said plurality of broadband switching ports associated with said voice call in accordance with a quality of service requirement for said voice call.

25. (previously presented):

An apparatus according to claim 23, wherein said narrowband interface further includes a voice/fax controller that converts packets associated with said voice call between said second media type and said first media type.

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26. (original):

An apparatus according to claim 25, wherein said voice/fax controller includes:

a plurality of digital signal processors that convert between digitized voice/fax streams associated with said voice call for communication by said narrowband connection and voice/fax packets for communication by said switching fabric;

a DSP service engine that repacketizes said voice/fax packets received from and sent to said digital signal processors in accordance with said first media type; and

a digital signal processor controller that controls packet communication between said digital signal processors and said DSP service engine.

27. (previously presented):

An apparatus according to claim 25, wherein said narrowband interface further includes a multi-service engine that converts said packets between said second media type and an intermediate switching media type of said switching fabric.

28. (original):

An apparatus according to claim 27, wherein said intermediate switching media type is ATM cells.

29. (previously presented):

An apparatus according to claim 26, wherein said narrowband interface further includes a multi-service engine that communicates with said DSP service engine and converts said

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packets between said second media type and an intermediate switching media type of said switching fabric.

30. (previously presented):

An apparatus according to claim 24, wherein said narrowband interface further includes:

a voice/fax controller that converts packets associated with said voice call between said second media type and said first media type; and

a multi-service engine that converts said packets between said second media type and an intermediate switching media type of said switching fabric.

31. (previously presented):

An apparatus according to claim 30, wherein said narrowband interface further includes:

a virtual circuit queue for buffering said packets between said voice/fax controller and said switching fabric; and

a SAR engine for servicing said virtual circuit queue in accordance with said quality of service requirement.

32. (currently amended):

A computer-readable medium having a sequence of instructions, the sequences of instructions, when executed by a processor, causing the processor to perform a method of providing differential voice over the network services in a carrier class switch apparatus, the method comprising:

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receiving a voice call having a first media type being any one of TDM voice/fax, VoIP, VoATM and VoFR, and a first signaling type corresponding to said first media type;
converting said voice call to a second media type different than said first media type, said second media type being any one of TDM voice/fax, VoIP, VoATM and VoFR media types;

determining said second media type in accordance with instantaneous availability of bandwidth resources;

relaying signaling associated with said voice call of said first signaling type to a second signaling type corresponding to said second media type; and

forwarding said voice call having said second media type.

33. (previously presented):

The computer-readable medium according to claim 32, wherein receiving said voice call includes receiving said voice call at a first interface of said switch apparatus, said first interface being one of a broadband interface and a narrowband interface, and wherein forwarding said voice call includes forwarding said voice call at a second interface of said switch apparatus, said second interface being one of said broadband interface and said narrowband interface.

34. (previously presented):

The computer-readable medium according to claim 32, wherein the method further comprises:
associating said voice call with a quality of service requirement.

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35. (previously presented):

The computer-readable medium according to claim 34, wherein the method further comprises:

determining said quality of service requirement in accordance with a service plan profile
of said calling party associated with said voice call.

36. (cancelled)

37. (previously presented):

The computer-readable medium according to claim 33, wherein the method further comprises:

switching packets associated with said voice call between said first interface and said
second interface.

38. (previously presented):

The computer-readable medium according to claim 37, wherein the method further comprises:

converting said voice call into said packets having an intermediate switching media type.

39. (previously presented):

The computer-readable medium according to claim 38, wherein said intermediate switching
media type is ATM cells.

40. (previously presented):

The computer-readable medium according to claim 37, wherein the method further comprises:

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associating said voice call with a quality of service requirement, said switching packets associated with said voice call being adapted to switch said packets at a rate corresponding to said quality of service requirement.

41. (previously presented):

The computer-readable medium according to claim 40, wherein the method further comprises:

determining said quality of service requirement in accordance with a service plan profile specific to said calling party associated with said voice call.

42. (cancelled)

43. (new):

A carrier class switch apparatus comprising:

means for receiving voice calls having TDM voice/fax, VoIP, VoATM and VoFR media types, said means for receiving a voice call having a first media type and a first signaling type corresponding to said first media type;

means for converting voice calls to TDM voice/fax, VoIP, VoATM and VoFR media types, said means for converting said voice call to a second media type different than said first media type;

means for determining said second media type in accordance with a service plan profile specific to a calling party associated with said voice call;

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means for relaying signaling associated with said voice call of said first signaling type to a second signaling type corresponding to said second media type; and

means for forwarding said voice call having said second media type.

44. (new):

An apparatus according to claim 43, wherein said means for receiving a voice call includes means for receiving said voice call at a first interface of said switch apparatus, said first interface being one of a broadband interface and a narrowband interface, and wherein said means for forwarding said voice call includes means for forwarding said voice call at a second interface of said switch apparatus, said second interface being one of said broadband interface and said narrowband interface.

45. (new):

An apparatus according to claim 43, further comprising:

means for associating said voice call with a quality of service requirement that is specific to said voice call.

46. (new):

An apparatus according to claim 45, further comprising:

means for determining said quality of service requirement in accordance with said service plan profile.

47. (new):

An apparatus according to claim 44, further comprising:

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means for switching packets associated with said voice call between said first interface and said second interface.

48. (new):

An apparatus according to claim 47, further comprising:

means for converting said voice call into said packets having an intermediate switching media type.

49. (new):

An apparatus according to claim 48, wherein said intermediate switching media type is ATM cells.

50. (new):

An apparatus according to claim 47, further comprising:

means for associating said voice call with a quality of service requirement, said means for switching packets associated with said voice call being adapted to switch said packets at a rate corresponding to said quality of service requirement.

51. (new):

An apparatus according to claim 50, further comprising:

means for determining said quality of service requirement in accordance with said service plan profile.

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52. (new):

A method of providing differential voice over the network services in a carrier class switch apparatus comprising:

receiving a voice call having a first media type with a broadband interface capable of receiving TDM voice/fax, VoIP, VoATM and VoFR media types, said voice call having a first signaling type corresponding to said first media type;

converting said voice call to a second media type different than said first media type, said second media type being any one of TDM voice/fax, VoIP, VoATM and VoFR media types;

determining said second media type in accordance with a service plan profile specific to said calling party associated with said voice call;

relaying signaling associated with said voice call of said first signaling type to a second signaling type corresponding to said second media type; and

forwarding said voice call having said second media type.

53. (new):

A method according to claim 52, wherein said step of receiving said voice call includes receiving said voice call at a first interface of said switch apparatus, said first interface being one of a broadband interface and a narrowband interface, and wherein said step of forwarding said voice call includes forwarding said voice call at a second interface of said switch apparatus, said second interface being one of said broadband interface and said narrowband interface.

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54. (new):

A method according to claim 52, further comprising:

associating said voice call with a quality of service requirement.

55. (new):

A method according to claim 54, further comprising:

determining said quality of service requirement in accordance with said service plan profile.

56. (new):

A method according to claim 53, further comprising:

switching packets associated with said voice call between said first interface and said second interface.

57. (new):

A method according to claim 56, further comprising:

said voice call into said packets having an intermediate switching media type.

58. (new):

A method according to claim 57, wherein said intermediate switching media type is ATM cells.

59. (new):

A method according to claim 56, further comprising:

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associating said voice call with a quality of service requirement, said step of switching packets associated with said voice call being performed so as to switch said packets at a rate corresponding to said quality of service requirement.

60. (new):

A method according to claim 59, further comprising:

determining said quality of service requirement in accordance with said service plan profile.

61. (new):

A computer-readable medium having a sequence of instructions, the sequences of instructions, when executed by a processor, causing the processor to perform a method of providing differential voice over the network services in a carrier class switch apparatus, the method comprising:

receiving a voice call having a first media type being any one of TDM voice/fax, VoIP, VoATM and VoFR, and a first signaling type corresponding to said first media type;
converting said voice call to a second media type different than said first media type, said second media type being any one of TDM voice/fax, VoIP, VoATM and VoFR media types;
determining said second media type in accordance with a service plan profile specific to a calling party associated with said voice call;

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relaying signaling associated with said voice call of said first signaling type to a second signaling type corresponding to said second media type; and
forwarding said voice call having said second media type.

62. (new):

The computer-readable medium according to claim 61, wherein receiving said voice call includes receiving said voice call at a first interface of said switch apparatus, said first interface being one of a broadband interface and a narrowband interface, and wherein forwarding said voice call includes forwarding said voice call at a second interface of said switch apparatus, said second interface being one of said broadband interface and said narrowband interface.

63. (new):

The computer-readable medium according to claim 61, wherein the method further comprises:
associating said voice call with a quality of service requirement.

64. (new):

The computer-readable medium according to claim 63, wherein the method further comprises:
determining said quality of service requirement in accordance with said service plan profile.

65. (new):

The computer-readable medium according to claim 62, wherein the method further comprises:

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switching packets associated with said voice call between said first interface and said second interface.

66. (new):

The computer-readable medium according to claim 65, wherein the method further comprises:
converting said voice call into said packets having an intermediate switching media type.

67. (new):

The computer-readable medium according to claim 66, wherein said intermediate switching media type is ATM cells.

68. (new):

The computer-readable medium according to claim 65, wherein the method further comprises:
associating said voice call with a quality of service requirement, said switching packets associated with said voice call being adapted to switch said packets at a rate corresponding to said quality of service requirement.

69. (new):

The computer-readable medium according to claim 68, wherein the method further comprises:
determining said quality of service requirement in accordance with said service plan profile.